Keith

A receptor heteromer mediates the male perception of female attractants in plants

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Sexual reproduction requires recognition between the male and female gametes. In flowering plants, the immobile sperms are delivered to the ovule-enclosed female gametophyte by guided pollen tube growth. Although the female gametophyte-secreted peptides have been identified to be the chemotactic attractant to the pollen tube[1, 2, 3], the male receptor(s) is still unknown. Here we identify a cell-surface receptor heteromer, MDIS1–MIK, on the pollen tube that perceives female attractant LURE1 in *Arabidopsis thaliana*. MDIS1, MIK1 and MIK2 are plasma-membrane-localized receptor-like kinases with extracellular leucine-rich repeats and an intracellular kinase domain. LURE1 specifically binds the extracellular domains of MDIS1, MIK1 and MIK2, whereas *mdis1* and *mik1 mik2* mutant pollen tubes respond less sensitively to LURE1. Furthermore, LURE1 triggers dimerization of the receptors and activates the kinase activity of MIK1. Importantly, transformation of At*MDIS1* to the sister species *Capsella rubella* can partially break down the reproductive isolation barrier. Our findings reveal a new mechanism of the male perception of the female attracting signals.

Structural disorder of monomeric α-synuclein persists in mammalian cells

Article, Nature, Feb. 4th, 2106

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Dorothea Lorenz

Intracellular aggregation of the human amyloid protein α-synuclein is causally linked to Parkinson's disease. While the isolated protein is intrinsically disordered, its native structure in mammalian cells is not known. Here we use nuclear magnetic resonance (NMR) and electron paramagnetic resonance (EPR) spectroscopy to derive atomic-resolution insights into the structure and dynamics of α-synuclein in different mammalian cell types. We show that the disordered nature of monomeric α-synuclein is stably preserved in non-neuronal and neuronal cells. Under physiological cell conditions, α-synuclein is amino-terminally acetylated and adopts conformations that are more compact than when in buffer, with residues of the aggregation-prone non-amyloid-β component (NAC) region shielded from exposure to the cytoplasm, which presumably counteracts spontaneous aggregation. These results establish that different types of crowded intracellular environments do not inherently promote α-synuclein oligomerization and, more generally, that intrinsic structural disorder is sustainable in mammalian cells.

Damian

1. Trehalose 6–phosphate coordinates organic and amino acid metabolism with carbon availability (pages 410–423)
   Carlos M. Figueroa, Regina Feil, Hirofumi Ishihara, Mutsumi Watanabe, Katharina Kölling, Ursula Krause, Melanie Höhne, Beatrice Encke, William C. Plaxton, Samuel C. Zeeman, Zhi Li, Waltraud X. Schulze, Rainer Hoefgen, Mark Stitt and John E. Lunn
   Article first published online: 30 JAN 2016 | DOI: 10.1111/tpj.13114

Significance Statement
Trehalose 6-phosphate (Tre6P), an intermediate of trehalose biosynthesis, is an essential signal metabolite that links the growth and development of plants to their metabolic status Here we show that short-term increases in Tre6Plead to post-translational activation of nitrate reductase and phosphoenolpyruvate carboxylase, thus increasing carbon flux into organic and amino acid synthesis.

2. Du, S., Zhang, R., Zhang, P., Liu, H., Yan, M., Chen, N., Xie, H., and Ke, S. (2015) Elevated CO2-induced production of nitric oxide (NO) by NO synthase differentially affects nitrate reductase activity in Arabidopsis plants under different nitrate supplies, *Journal of Experimental Botany*.

3. Structural and Functional Insights into the Evolution and Stress Adaptation of Type II Chaperonins

Jessica J. Chaston, Callum Smits, David Aragão, Andrew S.W. Wong, Bilal Ahsan, Sara Sandin, Sudheer K. Molugu, Sanjay K. Molugu, and others
Structure
Published online: February 4, 2016
Thermophiles survive under wide ranges of extreme conditions. Sulfolobales have evolved a modular system of chaperonins that rescue different classes of substrate proteins under different conditions. Structural analyses of three different complexes sheds new light on substrate specificity and dynamics as well as on the assembly and evolution of chaperonins.

4. Gut-Colonizing Bacteria Promote *C. elegans* Innate Immunity by Producing Nitric Oxide

Yi Xiao, Fang Liu, Zhigang Zhang, Jie Tang, Cheng-Gang Zou, Ke-Qin Zhang
Cell Reports
Published online: February 4, 2016
B. subtilis is a symbiont that resides in the gut of *C. elegans* and generates nitric oxide that is essential for the host. Xiao et al. demonstrate that nitric oxide promotes defense against pathogenic bacteria by activating p38 MAPK, demonstrating the importance of commensal bacteria in host immunity.

5.

- Naohiko Ohama,
- Kazuya Kusakabe,
- Junya Mizoi,
- Huimei Zhao,
- Satoshi Kidokoro,
- Shinya Koizumi,
- Fuminori Takahashi,
- Tetsuya Ishida,
- Shuichi Yanagisawa,
- Kazuo Shinozaki,
- and Kazuko Yamaguchi-Shinozaki

The Transcriptional Cascade in the Heat Stress Response of Arabidopsis Is Strictly Regulated at the Level of Transcription Factor Expression Plant Cell 2016 28: 181-201. Advance Publication December 29, 2015;doi:10.1105/tpc.15.00435

6. The type II NADPH dehydrogenase facilitates cyclic electron flow, energy dependent quenching and chlororespiratory metabolism during acclimation of Chlamydomonas reinhardtii to nitrogen deprivation

Shai I. Saroussi, Tyler M. Wittkopp, and Arthur R. Grossman
Plant Physiol. pp.15.02014; First Published on February 8, 2016; doi:10.1104/pp.15.02014 **OPEN**
http://www.plantphysiol.org/content/early/2016/02/08/pp.15.02014.abstract

7. Modulation of protein S-nitrosylation by isoprene emission in poplar

Elisa Vanzo, Juliane Merl-Pham, Violeta Velikova, Andrea Ghirardo, Christian Lindermayr, Stephanie M. Hauck, Jörg Bernhardt, Katharina Riedel, Jörg Durner, and Joerg-Peter Schnitzler

Plant Physiol. pp.15.01842; First Published on February 5, 2016; doi:10.1104/pp.15.01842

http://www.plantphysiol.org/content/early/2016/02/04/pp.15.01842.abstract

8. Nitric oxide, ethylene and auxin crosstalk mediates greening and plastid development in deetiolating tomato seedlings

Nielda K. G. Melo, Ricardo E. Bianchetti, Bruno S. Lira, Paulo M. R. Oliveira, Rafael Zuccarelli, Devisson L. O. Dias, Diego Demarco, Lázaro Eustáquio Pereira Peres, Magdalena Rossi, and Luciano Freschi

Plant Physiol. pp.16.00023; First Published on February 1, 2016; doi:10.1104/pp.16.00023 **OPEN**

http://www.plantphysiol.org/content/early/2016/02/01/pp.16.00023.abstract

9. **Correction/Retraction**

A Potential Role for Mitochondrial Produced Reactive Oxygen Species in Salicylic Acid-Mediated Plant Acquired Thermotolerance

Jon Munn

Plant Physiol. pp.16.00125; First Published on January 22, 2016; doi:10.1104/pp.16.00125

http://www.plantphysiol.org/content/early/2016/01/22/pp.16.00125

Retraction 2 Shengjun Nie, Haiyun Yue, and Da Xing (2015). A Potential Role for Mitochondrial Produced Reactive 3 Oxygen Species in Salicylic Acid-Mediated Plant Acquired Thermotolerance. Plant Physiology Preview 4 (DOI 10.1104/pp.15.00719). 5 The above article is being retracted by Plant Physiology, which issues the following statement: 6 After publication of the article on October 15, 2015, as a Plant Physiology Preview article, we were 7 alerted to the fact that Figure 9 and a considerable amount of text in the Results and Discussion sections 8 were identical (or nearly identical) to material in an article previously published by the same authors in 9 PLOS ONE (Mitochondrial-Derived Reactive Oxygen Species Play a Vital Role in the Salicylic Acid Signaling 10 Pathway in Arabidopsis thaliana; DOI 10.1371/journal.pone.0119853). The authors did not cite the PLOS 11 ONE article in the Plant Physiology article, nor did they indicate that Figure 9 had been duplicated from 12 this earlier publication. 13 ASPB invoked its ethics in publishing policies to evaluate this instance of self-plagiarism. On the basis of 14 available submission and publication dates of the two articles, ASPB concluded that because the PLOS 15 ONE paper was accepted for publication on January 16, 2015, more than four months before the Plant 16 Physiology article was submitted on May 26, 2015, it is necessary to retract the Plant Physiology article 17 in its entirety.

10. H3K36ac is an evolutionary conserved plant histone modification that marks active genes

Walid Mahrez, Minerva Susanna Trejo Arellano, Jordi Moreno-Romero, Miyuki Nakamura, Huan Shu, Paolo Nanni, Claudia Köhler, Wilhelm Gruissem, and Lars Hennig
Plant Physiol. pp.15.01744; First Published on January 13, 2016;
doi:10.1104/pp.15.01744 **OPEN**
http://www.plantphysiol.org/content/early/2016/01/13/pp.15.01744.abstract

Jarrett

A proposed regulatory framework for genome-edited crops
Sanwen Huang, Detlef Weigel, Roger N Beachy & Jiayang Li*Nature Genetics* **48**, 109–111 (2016) doi:10.1038/ng.3484
Published online 27 January 2016

Crop breeding is being revolutionized by rapid progress in DNA sequencing and targeted alteration of DNA sequences by genome editing. Here we propose a regulatory framework for precision breeding with 'genome-edited crops' (GECs) so that society can fully benefit from the latest advances in plant genetics and genomics.

Indu

Starck SR, Tsai JC, Chen K, Shodiya M, Wang L, Yahiro K, Martins-Green M, Shastri N, Walter P.

Translation from the 5' untranslated region shapes the integrated stress response.

Science. 2016 Jan 29;351(6272):aad3867. PMID: 26823435 [PubMed - in process]

Minsoo

1. Specific control of Arabidopsis BAK1/SERK4-regulated cell death by protein glycosylation
Marcos V. V. de Oliveira, Guangyuan Xu, Bo Li, Luciano de Souza Vespoli, Xiangzong Meng, Xin Chen, Xiao Yu, Suzane Ariádina de Souza, Aline C. Intorne, Ana Marcia E. de A. Manhães, Abbey L. Musinsky, Hisashi Koiwa, Gonçalo A. de Souza Filho, Libo Shan & Ping He
Nature Plants Article number: 15218 (2016)
Published online:
25 January 2016

2. Organic agriculture in the twenty-first century
John P. Reganold & Jonathan M. Wachter
Nature Plants 2, Article number: 15221 (2016)

3. Curr Biol. 2016 Jan 11;26(1):86-92. doi: 10.1016/j.cub.2015.11.043. Epub 2015 Dec
24.
Extensive Mitochondrial mRNA Editing and Unusual Mitochondrial Genome Organization in Calcaronean Sponges.

Lavrov DV(1), Adamski M(2), Chevaldonné P(3), Adamska M(2).

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4. Plant Cell Environ. 2016 Mar;39(3):628-44. doi: 10.1111/pce.12647. Epub 2015 Dec
21.
**The cytochrome c oxidase biogenesis factor AtCOX17 modulates stress responses in
Arabidopsis.**

Garcia L(1), Welchen E(1), Gey U(2), Arce AL(1), Steinebrunner I(2), Gonzalez DH(1).

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